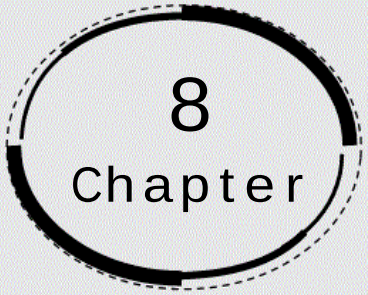
comparing quantities



Exercise: 7.1

1. Find the ratio of the following:

(a) Speed of a cycle 15 km per hour to the speed of scooter 30 km per hour.

Ans: Speed of a cycle $=$ 15 km

Speed of scooter $=30$ km

Ratio of the speed of a cycle to the speed of scooter

$$=\frac{15}{30}$$

$$=\frac{1}{2}$$

The required ratio is 1:2.

(b) 5 m to 10 km.

Ans: 5m to 10km.

Since 1km $=1000$ m

$$\Rightarrow \frac{5\text{ m}}{10\text{ km}}=\frac{5}{10}\times\frac{1}{1000}$$

$$=\frac{1}{2000}$$

$$\Rightarrow 1:2000$$

The required ratio is 1:2000.

(c) 50 paise to Rs 5.

Ans: 50 paise to Rs 5

Since Rs 1 = 100 paise

$$\Rightarrow \frac{50\,paise}{Rs5}$$

$$= \frac{50}{5} \times \frac{1}{100}$$

$$= \frac{1}{10}$$

$$\Rightarrow 1:10$$

The required ratio is 1:10.

2. Convert the following ratios to percentages.

(a) 3:4

Ans: $3:4 = \frac{3}{4}$

$$\Rightarrow \frac{3}{4} \times \frac{100}{100}$$

$$= 0.75 \times 100\%$$

$$= 75\%$$

The required ratio to percentage is 75%

(b) 2:3

Ans: $2:3 = \frac{2}{3}$

$= \frac{2}{3} \times \frac{100}{100}$

$= \frac{200}{3}\%$

$= 66\frac{2}{3}\%$

The required ratio to percentage is $66\frac{2}{3}\%$

3. 72% of 25 students are good in mathematics. How many are not good in mathematics?

Ans: Total number of students $= 25$.

Percentage of students are good in mathematics $= 72\%$

Percentage of students who are not good in mathematics $= (100 - 72)\%$

$\Rightarrow 28\%$

$\therefore$ Number of students who are not good in mathematics $= 28\% \times 25$

$\Rightarrow \frac{28}{100} \times 25$

$\Rightarrow \frac{28}{4}$

$\Rightarrow 7$

Students are not good in mathematics $= 7$

4. A football team won 10 matches out of the total number of matches they played. If their win percentage was 40, then how many matches did they play in all ?

Ans: The total number of matches won by the football team $= 10$.

Percentage of team $= 40\%$

The total number of matches played by the team $= ?$

The total number of matches played by the team

$\Rightarrow 40\% \times x = 10$

$\Rightarrow \frac{40}{100} \times x = 10$

$\Rightarrow x = 10 \times \frac{100}{40}$

$\Rightarrow x = \frac{100}{4}$

$\Rightarrow x = 25$

The total number of matches played by the team $= 25$.

5. If Chameli had Rs .600 left after spending 75% of her money, how much did she have in the beginning?

Ans: Chameli's money after spend $= 600$

Percentage of money after spend $= 75\%$

Beginning amount of chameli $= ?$

Percentage of beginning amount

$= (100 - 75)\%$

$= 25\%$

Beginning amount of chameli

$\Rightarrow 25\% \times x = 600$

$\Rightarrow \left(\frac{25}{100}\right) \times x = 600$

$\Rightarrow \left(\frac{1}{4}\right) \times x = 600$

$\Rightarrow x = 600 \times 4$

$\Rightarrow x = 2400$

Beginning amount of chameli $= 2400$.

6. If 60% people in city like cricket, 30% like football and the remaining like other games, then what per cent of the people like other games? If the total number of people are 50 lakh, find the exact number who like each type of game.

Ans: Total number of people in city $= 50$ lakh

Percentage of people like cricket $= 60\%$

Percentage of people like football $= 30\%$

Percentage of people like other games $= ?$

Number of people like each type of game $= ?$

Percentage of people like other games

$= (100 - 60 - 30)\%$

$= (100 - 90)\%$

$= 10\%$

Percentage of people like other games $= 10\%$

Number of people like cricket $= (60\% \times 50)$

$= \left(\frac{60}{100} \times 50\right)$

$= \frac{60}{2}$

$= 30$ lakh

Number of people like cricket $= 30$ lakh

Number of people like football $= (30\% \times 50)$

$= \left(\frac{30}{100} \times 50\right)$

$= \frac{30}{2}$

$= 15$ lakh

Number of people like football $= 15$ lakh

Number of people like other games $= (10\% \times 50)$

$= \left(\frac{10}{100} \times 50\right)$

$= \frac{10}{2}$

$= 5$ lakh.

Number of people like other games $= 5$ lakh.

EXERCISE 7.2

1. During a sale, a shop offered a discount of 10\% on the marked prices of all the items. What would a customer have to pay for a pair of jeans marked at Rs 1450 and two shirts marked at Rs 850 each?

Ans: Discount percentage = 10\%

Price of pair jeans = Rs.1450

Price of shirt = Rs. 850

Formula: Discount $=$ Marked price $-$ Sale price.

One shirt price = Rs. 850

Two shirt price = $2\times$ Rs. 850 $\Rightarrow$ Rs. 1,700

Total marked price = Rs. $(1,450+1,700)$

= Rs.3,150

Discount = Rs. $(10\%\times 3150)$

= Rs. $\left(\frac{10}{100}\times 3150\right)$

Discount = Rs.315.

Discount = Total Marked price - Sale price

$\Rightarrow$ Rs 315 = Rs 3150 $-$ Sale price

$\Rightarrow$ Sale price $=$ Rs $(3150-315)$

$\Rightarrow$ Sale price $=$ Rs 2835

Customer paid $=$ Rs 2835.

.

2. The price of a TV is Rs 13,000. The sales tax charged on it is at the rate of 12%**. Find the amount that Vinod will have to pay if he buys it.**

Ans: Price of TV $=$ Rs. 13,000.

Sales tax percentage $=12\%$

Vinod have to pay $=?$

If Rs.100, then Tax to be pay is Rs. 12.

When Rs. 13,000

Tax to be pay $=\left(\frac{12}{100}\times 13,000\right)$

Tax to be pay $= 12 \times 130$

Tax to be pay $=$ Rs. 1,560.

Vinod have to pay $=$ price of TV $+$ Tax to be pay

$=$ Rs. 13,000 $+$ Rs. 1560

$=$ Rs. 14560

Vinod have to pay $=$ Rs. 14560.

3. Arun bought a pair of skates at a sale where the discount given was 20%. If the amount he pays is Rs 1,600. Find the marked price.

Ans: Discount in skates $= 20\%$

Total amount $= 1,600$

Marked price $= x$

Formula: Discount percent $= \left(\frac{Discount}{Marked\ price} \right) \times 100$

Discount percent $= \left(\frac{Discount}{Marked\ price} \right) \times 100$

$\Rightarrow 20 = \left(\frac{Discount}{x} \right) \times 100$

Discount $= \frac{20 \times x}{100}$

Discount $= \frac{1 \times x}{5}$

Discount $=$ Marked price $-$ Total amount

$\Rightarrow \frac{1\times x}{5} = x - 1600$

$\Rightarrow 1600 = x - \frac{1}{5}x$

$\Rightarrow 1600 = \frac{5x - x}{5}$

$\Rightarrow 1600 = \frac{4x}{5}$

$\Rightarrow \frac{1600\times 5}{4} = x$

$\Rightarrow x = 400\times 5$

$\Rightarrow x = 2000$

Marked price $= 2000$.

4. I purchased a hair-dryer for Rs 5,400 including 8% VAT. Find the price before VAT was added.

Ans: Hair-dryer rate include VAT $= 5,400$

Tax percentage $= 8\%$

Rate before VAT $= ?$

$\text{VAT} = 8\%$

If VAT without Rs.100, then price is Rs. 108

When Rs. 5400

Rate before VAT $= \left(\frac{100}{108}\times 5400\right)$

Rate before VAT $= 100\times 50$

Rate before VAT $=$ Rs. 5000.

5: An article was purchased for Rs. 1239 including GST of 18%. Find the price of the article before GST was added?

Ans: Given that the price of an article including GST of 18% is Rs.1239

Let the price of the article before GST be x

Therefore, x +18% of x = 1239

$\Longrightarrow$ x + $\frac{18x}{100}$ = 1239

$\Longrightarrow$ $\frac{100x+18x}{100}$ = 1239

$\Longrightarrow$118x=1239×100

$\Longrightarrow$ x = $\frac{1239\times100}{118}$ = 1050

Therefore the price of the article before GST is Rs.1050

EXERCISE 7.3

1. The population of a place increased to 540002 in 2003 at a rate of 5% **per annum**

(i) Find the population in 2001

Ans: Population in the year $2003 = 54,000$

$54000 = \text{population in } 2001 \times \left(1+\frac{5}{100}\right)^2$

$54000 = \text{population in } 2001 \times \left(\frac{100+5}{100}\right)^2$

$$54000 = \text{population in } 2001 \times \left(\frac{105}{100}\right)^2$$

$$54000 = \text{population in } 2001 \times (1.05)^2$$

$$54000 = \text{population in } 2001 \times 1.1025$$

$$\frac{54000}{1.1025} = \text{Population in } 2001$$

$$\text{Population in } 2001 = 48979.591$$

(ii) What would be its population in 2005?

Ans: Population in 2005

$$\text{Population in } 2001 = 54000\left(1+\frac{5}{100}\right)^2$$

$$\text{Population in } 2001 = 54000\left(\frac{100+5}{100}\right)^2$$

$$\text{Population in } 2001 = 54000\left(\frac{105}{100}\right)^2$$

$$\text{Population in } 2001 = 5400(1.05)^2$$

$$\text{Population in } 2001 = 54000 \times 1.1025$$

$$\text{Population in } 2001 = 59.535$$

2. In a laboratory, the count of bacteria in a certain experiment was increasing at the rate of 2.5% **per hour. Find the bacteria at the end of** 2 **hours if the count was initially 5,06,000.**

Ans: Initial count of bacteria $= 5,06,000$

Bacteria at the end of 2 hours

$= 506000\left(1+\frac{2.5}{100}\right)^2$

$= 506000(1+0.025)^2$

$= 506000(1.025)^2$

$= 506000(1.050625)$

$= 531616.25$ (Approximately)

The count of bacteria at the end of 2 hours $= 531616.25$.

3. A scooter was bought at Rs 42,000. Its value depreciated at the rate of 8% per annum. Find its value after one year.

Ans: Principal (P) = Rs 42,000

Rate(R) = 8% per annum

Number (n) = 1 year.

Formula: S.I $= \frac{P \times R \times T}{100}$

S.I = Rs $\left(\frac{42000 \times 8 \times 1}{100}\right)$

S.I = Rs 8×420

S.I = Rs 3360

Value after 1 year = Rs. $(42000 - 3360)$

= Rs. 38,640.